Understanding the Symbols

- Upward market pressure
- Flat market pressure
- Downward market pressure
### Last Year’s Projection: How Did We Score?

<table>
<thead>
<tr>
<th>Predicted Pressure on Prices</th>
<th>Actual Pressure on Prices</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>

**Correctly predicted:**

We projected winter-over-winter demand increase due to colder winter and exports, but production would reach record—resulting in flat pressure on prices

- Last winter 2017-2018 average Henry Hub price = $2.99 MMBtu
- Previous winter 2016-2017 average Henry Hub price = $3.01 MMBtu
2018-2019 Winter Outlook: **Outline**

- Looking ahead to Winter 2018-2019
  - Market pressure points:
    - Weather
    - Economy
    - Demand
    - Storage
    - Production
  - Wild card factors
  - Winter expectations

- **Summary**
**Demand: Winter Weather**

<table>
<thead>
<tr>
<th>Last Winter (Nov. – March) 2017-2018 ACTUAL</th>
<th>This Winter 2018-2019 FORECAST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual winter heating season:</td>
<td>Forecast:</td>
</tr>
<tr>
<td>14% <em>colder</em> than previous winter but</td>
<td>1% <em>warmer</em> than last year</td>
</tr>
<tr>
<td>1% warmer than 30-year average</td>
<td>2% warmer than 30-year average</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>3,497 Heating degree days (NOAA)</td>
<td>3,455 Heating degree days</td>
</tr>
</tbody>
</table>

Winter-to-winter pressure on natural gas prices

Maps: National Oceanic and Atmospheric Administration; Data: Energy Ventures Analysis
## Demand: Economy

### Winter Season

Period-to-period change

<table>
<thead>
<tr>
<th></th>
<th>Last Winter 2017-2018 ACTUAL</th>
<th>This Winter 2018-2019 FORECAST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economy Strengthening</td>
<td>2.5%</td>
<td>3.2%</td>
</tr>
<tr>
<td>Economy Robust</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDP growth</td>
<td>2.5%</td>
<td>3.2%</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>4.1%</td>
<td>3.5%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>1.9%</td>
<td>2.5%</td>
</tr>
<tr>
<td>CPI</td>
<td>2.2%</td>
<td>2.5%</td>
</tr>
<tr>
<td>World GDP Growth</td>
<td>3.2%</td>
<td>3.3%</td>
</tr>
<tr>
<td>Consumer Sentiment Index</td>
<td>98.6</td>
<td>98.2</td>
</tr>
</tbody>
</table>

**Winter-to-winter pressure on natural gas prices**
### Demand: Customer Demand

#### Winter Season

<table>
<thead>
<tr>
<th>Period-to-period change</th>
<th>Last Winter 2017-2018 ACTUAL</th>
<th>This Winter 2018-2019 FORECAST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Gas Demand*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Residential/Commercial</td>
<td>37.8 Bcf/d</td>
<td>36.9 Bcf/d</td>
</tr>
<tr>
<td>- Electric</td>
<td>24.1 Bcf/d</td>
<td>24.8 Bcf/d</td>
</tr>
<tr>
<td>- Industrial</td>
<td>24.1 Bcf/d</td>
<td>24.5 Bcf/d</td>
</tr>
<tr>
<td>- Pipeline exports- Mexico</td>
<td>4.4 Bcf/d</td>
<td>5.2 Bcf/d</td>
</tr>
<tr>
<td>- LNG exports (net)</td>
<td>3.0 Bcf/d</td>
<td>4.7 Bcf/d</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>99.3 Bcf/d</strong></td>
<td><strong>102.7 Bcf/d</strong></td>
</tr>
</tbody>
</table>

#### Growth sector

- Res/Comm +12%
- Electric + 13%
- LNG Exports +57%

#### Winter-to-winter pressure on natural gas prices

*Includes “Lease, Plant and Pipeline Fuel”
FOCUS: Record-Setting Winter Electric Sector Demand

WINTER ELECTRIC DEMAND FOR GAS

BCFD

<table>
<thead>
<tr>
<th>Year</th>
<th>Demand</th>
<th>Year</th>
<th>Demand</th>
<th>Year</th>
<th>Demand</th>
<th>Year</th>
<th>Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/13</td>
<td>19.7</td>
<td>13/14</td>
<td>20.1</td>
<td>14/15</td>
<td>21.8</td>
<td>15/16</td>
<td>24.3</td>
</tr>
<tr>
<td>16/17</td>
<td>21.2</td>
<td>17/18</td>
<td>24.1</td>
<td>18/19</td>
<td>24.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: light blue=cold winter, red=warm winter, dark blue=normal winter. Source: EVA
**FOCUS ON ELECTRICAL SECTOR DEMAND:** Increase in demand for natural gas now driven mostly by new natural gas-fired generation

<table>
<thead>
<tr>
<th>Year</th>
<th>Power Burn (Bcf/Day)</th>
<th>Henry Hub ($/MMBtu)</th>
<th>Weather Adjusted Power Burn Increase from Base Year 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>0.2</td>
<td>-0.4</td>
<td>-</td>
</tr>
<tr>
<td>2015</td>
<td>0.9</td>
<td>4.39</td>
<td>2.8</td>
</tr>
<tr>
<td>2016</td>
<td>1.5</td>
<td>2.63</td>
<td>3.0</td>
</tr>
<tr>
<td>2017</td>
<td>1.3</td>
<td>2.52</td>
<td>1.3</td>
</tr>
<tr>
<td>2018 Est.</td>
<td>3.8</td>
<td>2.97</td>
<td>1.5</td>
</tr>
</tbody>
</table>

- **Short-term ‘economic’ increase in electric demand for natural gas as price of natural gas makes it economic to run natural gas generation rather than coal generation.**
- **Long-term ‘structural’ increase in electric sector demand for natural gas spurred by new natural gas-fired generation.**

*Note: Values are adjusted for weather. Source: Energy Ventures Analysis*
Focus: Industrial Demand Peak Growth Phase
Natural Gas Spurring 46 Major Industrial Projects 2018–2023

$79 Billion Investment to Build

32 New Projects
29 Petrochemical
2 Fertilizer
1 Steel

7 Expansions
7 Petrochemical

7 Re-starts
4 Steel
2 Aluminum
1 Petrochemical

Increase of 2.1 Bcf/d by 2023

In addition to

33 COMPLETED Projects for additional $53 Billion and 1.5 Bcf/d from 2015-2017

Photo courtesy: Chevron U.S.A. Inc., 2017 (Pascagoula)

Data Source: Energy Ventures Analysis, Sept. 2018
FOCUS: Big Increase in Exports, But Remain Small Share of All Natural Gas Demand

Natural Gas Demand Sectors Winter 2018-2019

- Res/Comm: 36%
- Industrial: 24%
- Electric: 24%
- Lease, Plant, Pipeline Fuel: 6%
- Pipeline Exports to Mexico: 5%
- LNG Exports: 5%

Total demand 102.7 Bcf/d
## Supply: Winter Storage

<table>
<thead>
<tr>
<th>Winter Season</th>
<th>Last Winter 2017-2018 (ACTUAL)</th>
<th>This Winter 2018-2019 (FORECAST)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start-of-winter inventory</td>
<td>3,790 Bcf</td>
<td>3,302 Bcf</td>
</tr>
<tr>
<td>Compared to 5-year average (Percent of total storage inventory)</td>
<td>1% lower</td>
<td>14% lower</td>
</tr>
<tr>
<td>New storage capacity</td>
<td>0 Bcf</td>
<td>Est. 3 Bcf</td>
</tr>
</tbody>
</table>

Winter-to-winter pressure on natural gas prices

Data Sources: Energy Information Administration and Energy Ventures Analysis
## Supply: Winter Production and Imports

<table>
<thead>
<tr>
<th>Winter Season</th>
<th>Last Winter 2017-2018 Actual</th>
<th>This Winter 2018-2019 Forecast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter average production (Lower 48)</td>
<td>77.4 Bcf/d</td>
<td>84.9 Bcf/d</td>
</tr>
<tr>
<td>Canadian imports (net)</td>
<td>5.4 Bcf/d</td>
<td>5.2 Bcf/d</td>
</tr>
</tbody>
</table>

*Winter-to-Winter pressure on natural gas prices*
Supply: **Record Growth in Production Continues**

**14 BCFD Growth in U.S. Gas Production from 2013 to 2018 YTD, or 21%**

- **Rocky Mountain**
  - 2013: 11.1
  - 2018: 11.3

- **Mid-Continent**
  - 2013: 9.3
  - 2018: 9.5

- **West**
  - 2013: 3.6
  - 2018: 3.9

- **Texas**
  - 2013: 19.0
  - 2018: 17.5

- **Gulf of Mexico**
  - 2013: 3.9
  - 2018: 2.6

- **Northeast**
  - 2013: 12.0
  - 2018: 27.4

- **Southeast**
  - 2013: 6.4
  - 2018: 7.0

*Source: PointLogic, EVA*
Comparison of Impact of Severe Weather on Daily Prices
What a Difference a Decade Makes

Per MMBtu

Pre-Shale
- Hurricanes Katrina & Rita
- Pre-Recession Commodities “Bubble”

Post-Shale
- Shale Gas Revolution
- 1-Day Cold Snap
- Polar Vortex Winter
- Bomb Cyclone
- Hurricanes Harvey & Irma
- Hurricane Florence

Daily Price at Henry Hub

Data Source: Gas Daily
Winter Outlook: **Wild Cards**
This Season’s Winter Outlook

<table>
<thead>
<tr>
<th>Winter Season Period-to-period change</th>
<th>This Winter 2018-2019 FORECAST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weather</td>
<td></td>
</tr>
<tr>
<td>Economy</td>
<td></td>
</tr>
<tr>
<td>Overall demand</td>
<td></td>
</tr>
<tr>
<td>Storage</td>
<td>▲</td>
</tr>
<tr>
<td>Winter supply</td>
<td>▼</td>
</tr>
</tbody>
</table>

**Winter-to-winter pressure on natural gas prices**
Natural Gas Outlook: Flexible, Stable Gas Market

- Record customer demand to surpass even Polar Vortex winter 2013-2014
  - Exports – LNG and pipeline – increase but remain small slice of overall demand, provide stability in ebbs and flows of market
  - New gas-fired generation could push electric demand to new winter record despite warmer winter
  - Slight growth in industrial demand due to manufacturing running at greater capacity

- Storage at lowest level of shale era, but production takes pressure off
  - Efficiencies in drilling and production continue to make wells productive at lower cost
  - Diverse supply sources contribute to greater flexibility and resilience evidenced by limited supply impact of deep freeze, hurricanes
About NGSA

- Represents major producers and suppliers of domestic natural gas
  - Integrated and independent companies: 14 members
  - Founded in 1965

- Only national natural gas association representing producers and suppliers with a dedicated focus on downstream issues

- Promotes benefits of competitive natural gas markets, resulting in reliable and efficient transportation and delivery, increased supply and demand

- Combined with the Center for LNG
2018-2019 Winter Outlook

Markets Matter

Contact:
Daphne Magnuson
dmagnuson@ngsa.org
@natgas_ngsa
www.ngsa.org

Natural Gas Supply Association

www.ngsa.org